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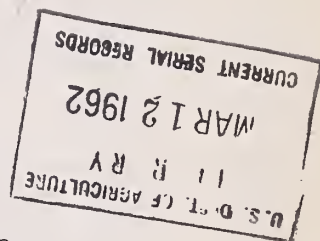
RESEARCH
NOTE

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PLANTING DEPTHS FOR SEEDS OF THREE SPECIES OF CEANOETHUS

By 2
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ABSTRACT:

An exploratory study suggests that emergence of deerbrush, Lemmons, and wedgeleaf ceanothus may be best when seed is planted at depths of 1/2 to 1 inch. Field tests should be made to determine optimum planting depths.

The depth at which seed of browse species are planted may have a pronounced effect on seedling emergence and consequently on the eventual planting success. Hubbard^{1/} found that bitterbrush (Purshia tridentata) seed would send up seedlings from any depth to 2 1/2 inches, but the highest and most consistent emergence came from the 1-inch depth.

In connection with deer habitat research on the western slopes of the Sierra Nevada, it became important to know the depth requirements of Ceanothus seed. Three species, deerbrush (C. integerrimus H. & A.), Lemmons ceanothus (C. Lemmonii Parry), and wedgeleaf ceanothus (C. cuneatus [Hook.]), were studied. Seeds of deerbrush and Lemmons ceanothus were stratified 63 days in moist sand at 42°F. before planting. Wedge-leaf seeds were stratified for 72 days under the same conditions.

The deerbrush and Lemmons ceanothus seed were planted on March 29, 1961, in flats at depths of 0, 1/4, 1/2, 1, and 1-3/4 inches. The wedge-leaf seed were planted April 12 at depths of 0, 1, 1-1/2, 2, and 2-1/2 inches. The flats contained an unsterilized mixture of sand, peat, and soil. After planting they were arranged on cleats on the cement floor of an outdoor patio in Walnut Creek, California. Watering at 2- to 3-day intervals was done with a garden hose. One end of each flat was placed against a low wall. This shaded part of each flat and left part in direct sunlight.

^{1/} Hubbard, Richard L. Effect of depth of planting on the emergence of bitterbrush seedlings. Calif. Forest and Range Expt. Sta. Forest Res. Note No. 113. 6 pp., illus.

Table 1.--Number of deerbrush and Lemmons ceanothus seedlings that emerged from various planting depths, shaded and unshaded^{1/}

Planting depth, inches	Deerbrush			Lemmons ceanothus		
	Shade	Sun	Total	Shade	Sun	Total
Surface	4	0	4	4	0	4
1/4	21	6	27	23	4	27
1/2	28	10	38	25	25	50
1	24	19	43	25	24	49
1-3/4	17	14	31	22	13	35
Total	94	49	143	99	66	165

^{1/} 72 seeds were planted under each condition except the 1-3/4-inch depth, which received only 54 seeds.

Table 2.--Number of wedgeleaf ceanothus seedlings that emerged from various planting depths, shaded and unshaded^{1/}

Planting depth, inches	Shade	Sun	Total
Surface	0	0	0
1	30	11	41
1-1/2	29	18	47
2	20	8	28
2-1/2	9	4	13
Total	88	41	129

^{1/} 40 seeds were planted at each depth and condition.

Emerged seedlings were tallied on April 12 and 30 and on May 13 and 18. Emergence in deerbrush and Lemmons ceanothus was complete by April 30. May 18 marked the end of the emergence period for wedgeleaf. Air temperature at a nearby weather station for the March 29-April 30 period ranged from 31° to 87°F. For the April 12-May 18 period the range was from 31° to 83°F. The mean maximum for both periods was 73° and the mean minimum 41°F.

In deerbrush and Lemmons ceanothus seedling emergence occurred from all depths and under all conditions except surface planting (uncovered) in direct sun (table 1). Shading was definitely beneficial with both species. With deerbrush in the shade, emergence was best from the 1/2-inch depth, progressively less from 1-inch, 1/4-inch, and 1-3/4-inch depths, and poorest from surface planting. In the sun, emergence with this species was best from 1 inch and poorest from 1/4 inch except that surface planting gave no emergence at all. Emergence from other depths was intermediate.

With Lemmons ceanothus, emergence was best and equal from the 1/2- and 1-inch depths regardless of shade. With shade, the 1/4-inch and 1-3/4-inch depths were nearly as good but the surface planting very much poorer. In the sun, this species emerged not at all from surface planting and poorly from the 1/4-inch and 1-3/4-inch depths.

Wedgeleaf showed the same overall benefit of shade but with the highest emergence coming from the 1-inch and 1 1/2-inch depths, both in sun and shade (table 2).

Stewart^{2/} recommended planting browse seed at depths approximately twice the diameter of the seed. This would mean about 1/4 inch or less with the species of Ceanothus used in these trials. This recommendation is at variance with our findings.

Field planting guides probably should not be drawn from these results until they have been tested under practical conditions. Such tests are planned.

^{2/} Stewart, Alfred J. Propagation and cultivation. In Van Rensselaar, Maunsell and McMin, Howard E. Ceanothus. pp. XVI+308. Santa Barbara Botanic Garden. 1942.

